Wochnick, Heather M CIV NAVFAC HQ, BRAC PMO

From: Chammas, Guy A CIV
Sent: Thursday, March 29, 2018 17:32
To: Carl Spangenberg
Cc: Arseny Kalinsky
Subject: FW: *Corrected Version* RE: PFAS Presentation for Distribution
Attachments: PFAS_Meeting_WaterDdistricts_03.29.18.pdf
Signed By: GUY.CHAMMAS@NAVY.MIL

Hi Carl,
Sending this to you as Arseny has an out-of-office message indicating he is out until 9 April. Thanks

-----Original Message-----
From: Chammas, Guy A CIV
Sent: Thursday, March 29, 2018 5:30 PM
To: 'Arseny Kalinsky'
Cc: Smits, Marc P CIV NAVFAC HQ, BRAC PMO; Callian, James T CIV NAVFAC HQ, BRAC PMO; Bollweg, Alejandro M CTR NAVFAC HQ, BRAC PMO; Fagan, Shannon L CIV NAVFAC SW, TRIS; Anderson, Scott D CIV NAVFAC HQ, BRAC PMO
Subject: *Corrected Version* RE: PFAS Presentation for Distribution

Hi Arseny, thanks for hosting a successful PFAS meeting today. As I mentioned, there were some errors in the units for some of the data we presented. Attached is a revised/corrected presentation. Please distribute to your team and ask that they delete the previous version. Thanks again!

-----Original Message-----
From: Chammas, Guy A CIV
Sent: Wednesday, March 28, 2018 4:24 PM
To: 'Arseny Kalinsky'
Cc: Smits, Marc P CIV NAVFAC HQ, BRAC PMO; Callian, James T CIV NAVFAC HQ, BRAC PMO; Bollweg, Alejandro M CTR NAVFAC HQ, BRAC PMO; Fagan, Shannon L CIV NAVFAC SW, TRIS; Anderson, Scott D CIV NAVFAC HQ, BRAC PMO
Subject: PFAS Presentation for Distribution

Arseny,
Please distribute the attached final agenda and Navy slides in preparation for our meeting tomorrow. Thank you.

Guy Chammas, MS, PG, CPSS
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Former Marine Corps Air Stations El Toro and Tustin
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Naval Facilities Engineering Command

FORMER MARINE CORPS AIR STATION EL TORO

Discussion of Per- and Polyfluoroalkyl Substances (PFAS) Detections in Groundwater in the Vicinity of Former Marine Corps Air Station El Toro

Guy Chammas, MS, PG, CPSS, Lead Remedial Project Manager
Marc Smits, PE, BRAC Environmental Coordinator
Alex Bollweg, Environmental Engineering Support
U.S. Department of the Navy (Navy)
Base Realignment and Closure (BRAC) Program Management Office West

29 March 2018

PFAS Background

- **Nomenclature**
  - –Use of “PFAS” preferred over “PFC”
  - –Perfluoroalkyl substances are fully fluorinated (C–F bond very strong)
  - –Polyfluoroalkyl substances are partially fluorinated (more degradable)
  - –Perfluorooctanoic acid (PFOA), perfluorooctanesulfonic acid (PFOS), perfluorobutane sulfonic acid (PFBS)
- **Sources**
  - –Manufacturing
    - Textiles, leather, paper products, metal plating, etc.
  - –Consumer Products
    - Nonstick cookware, carpet, waterproof clothing, dental floss, etc.
  - –Burn Areas/Firefighting Training Areas
  - –Wastewater Treatment Plants
- **Properties**
  - –High solubility
  - –Low partition coefficient
  - –Low volatility
  - –Primarily anionic (PFOS and PFOA are relatively strong acids)
  - –Thermally and chemically stable

PFAS Background (cont.)

- **Regulations**
  - –Not a Comprehensive Environmental Response, Compensation, and Liability Act hazardous substance
  - –No promulgated drinking water, human health, or ecological standards at state or federal level (other states have promulgated values)
  - –United States Environmental Protection Agency (U.S. EPA) Lifetime Health Advisories (LHAs) for PFOA, PFOS, PFOA+PFOS are 0.07 micrograms per liter (µg/L)
  - –U.S. EPA Regional Screening Level (RSL) for PFBS is 400 µg/L

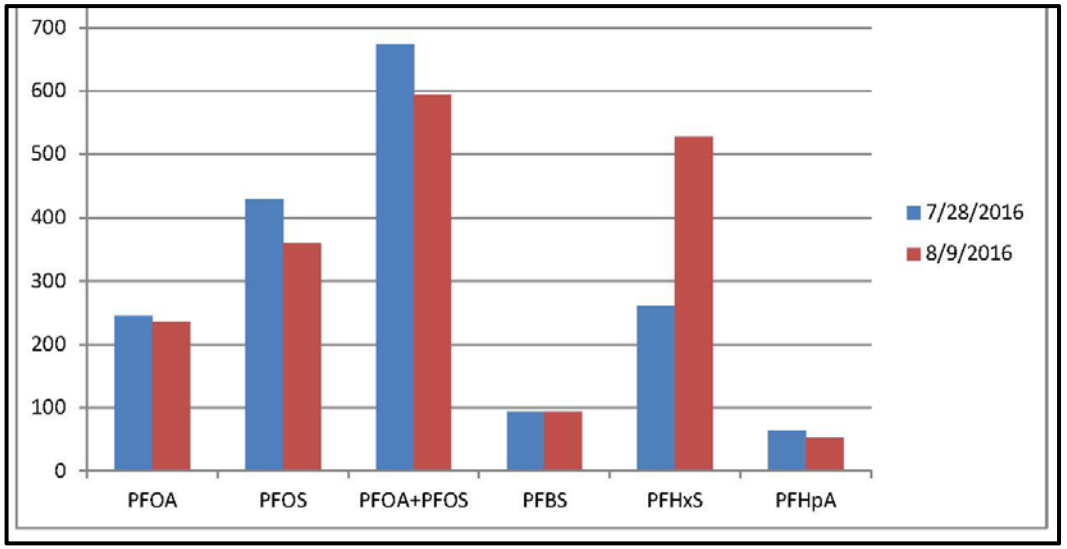
Water District Sampling Results

- Local drinking water not impacted based on U.S. EPA Unregulated Contaminant Monitoring Rule 3 sampling and analysis (2013, 2014)
- Shallow Groundwater Unit (SGU) Treatment Plant influent sampled twice in 2016

		Method 537 Analysis						
Site ID	Sample Date	PFOA	PFOS	PFOA+PFOS	PFBS	PFHxS	PFHpA	PFNA
SGU INFLUENT - El Toro MCAS	7/28/2016	**244**	**430**	**674**	**94**	**260**	**64**	ND
SGU INFLUENT - El Toro MCAS	8/9/2016	**235**	**359**	**594**	**93**	**527**	**52**	ND

Notes:

1. Units are parts per trillion (ppt)
2. PFOA, PFOS, PFOA+PFOS LHA is 70 ppt
3. PFBS RSL is 400,000 ppt
4. Detections are bolded
5. Exceedences are highlighted in yellow



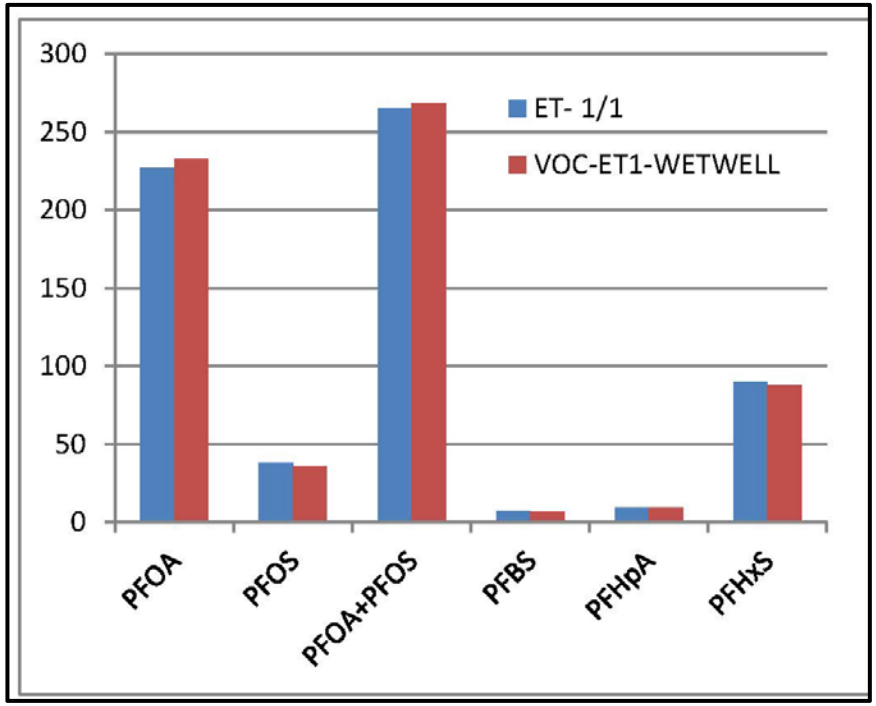
Water District Sampling Results (cont.)

- Principal Aquifer groundwater at extraction well ET-1 sampled in 2016
  - –Pre-treatment (ET-1/1)
  - –Post-treatment (VOC-ET1-WETWELL)

Site ID	Sample Date	PFOA	PFOS	PFOA+PFOS	PFBS	PFHpA	PFHxS
ET - 1/1	10/19/2016	**227**	**38.2**	**265**	**7.0**	**9.4**	**89.6**
VOC-ET1-WETWELL	10/19/2019	**233**	**35.8**	**269**	**6.8**	**9.3**	**87.5**

Notes:

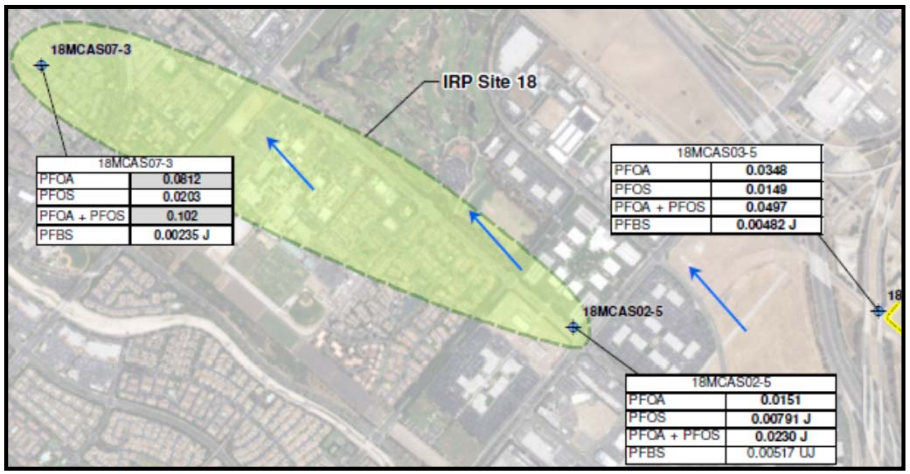
1. Units are parts per trillion (ppt)
2. PFOA, PFOS, PFOA+PFOS LHA is 70 ppt
3. PFBS RSL is 400,000 ppt
4. Detections are bolded
5. Exceedences are highlighted in yellow



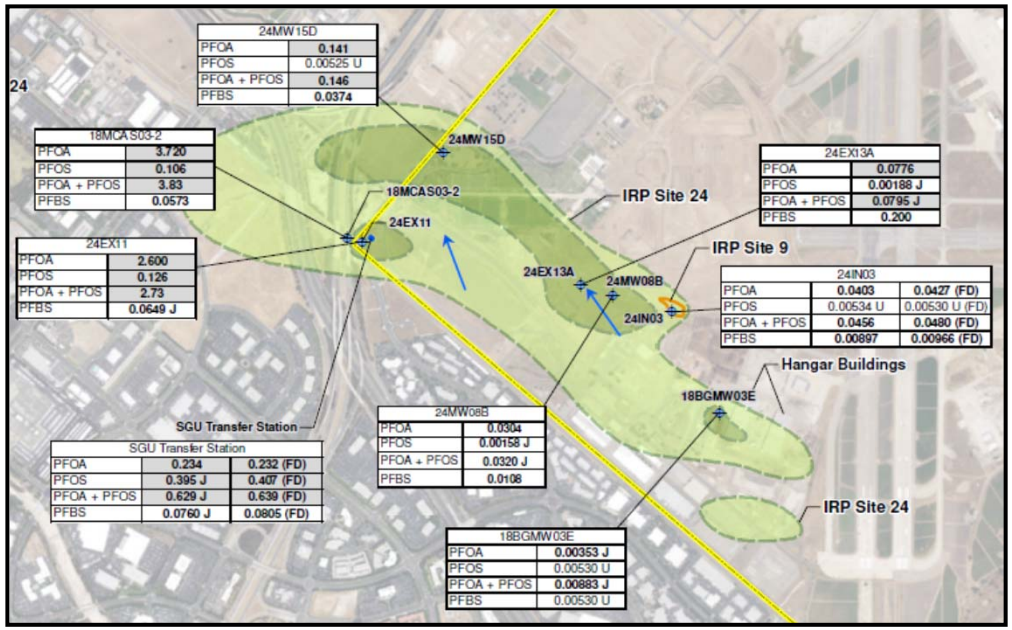
Navy Sampling Results

- Potential PFAS source areas screened in desktop analysis
- Installation Restoration Program (IRP) Sites 1, 2, 5, 9, 16, 18, 24 sampled
  - –22 primary and 3 duplicate samples collected in July 2017
- PFOS and/or PFOA detected at concentrations exceeding LHA at IRP Sites 1, 18 (Principal Aquifer), and 24 (SGU)

IRP SITE 18



IRP SITE 24



Navy Sampling Results (cont.)

Table 6
Groundwater Analysis - PFOA, PFOS, and PFBS Results

	Screened Interval	Sample Date	PFOA	PFOS	PFOA + PFOS	PFBS
			µg/L			
	Screening Criterion		0.07 [1]	0.07 [1]	0.07 [1]	400 [2]
IRP Site 18 (PA)						
18MCAS07-3	350-360	7/10/2017	**0.0812**	**0.0203**	**0.102**	**0.00235 J**
18MCAS02-5	420-430	7/10/2017	**0.0151**	**0.00791 J**	**0.0230 J**	0.00517 UJ
18MCAS03-5	420-430	7/10/2017	**0.0348**	**0.0149**	**0.0497**	**0.00482 J**
IRP Sites 9 and 24 (SGU)						
24IN03	140-160	7/12/2017	**0.0403**	0.00534 U	**0.0456**	**0.00897**
DUP02 (Parent: 24IN03)	140-160	7/12/2017	**0.0427**	0.00530 U	**0.0480**	**0.00966**
24MW08B	160-170	7/10/2017	**0.0304**	**0.00158 J**	**0.0320 J**	**0.0108**
24EX13A	145-165	7/12/2017	**0.0776**	**0.00188 J**	**0.0795 J**	**0.200**
24MW15D	220-230	7/12/2017	**0.141**	0.00525 U	**0.146**	**0.0374**
24EX11	195-215	7/10/2017	**2.600**	**0.126**	**2.73**	**0.0649 J**
SGU Transfer Station	N/A; effluent sample	7/10/2017	**0.234**	**0.395 J**	**0.629 J**	**0.0760 J**
DUP03 (Parent: SGU Transfer Station)	N/A; effluent sample	7/10/2017	**0.232**	**0.407**	**0.639**	**0.0805**
18BGMW03E	124-164	7/12/2017	**0.00353 J**	0.00530 U	**0.00883 J**	0.00530 U
18MCAS03-2	160-170	7/10/2017	**3.720**	**0.106**	**3.83**	**0.0573**

Navy Sampling Results (cont.)

- IRP Site 18 had marginal exceedances only at furthest downgradient well (additional non-Navy source?)
- IRP Site 24 had highest detections (up to 3.83 µg/L) along base border
- SGU results from Water Districts and Navy very similar
  - –Water District: PFOA+PFOS = 0.634 µg/L (average of 2 samples)
  - –Navy: PFOA+PFOS = 0.634 µg/L (average of primary and duplicate)
- PFBS was not detected at concentrations greater than RSL

Settlement Agreement Stipulations

- Notification
  - –Separate notification letters to BRAC Cleanup Team and Water Districts on 26 October 2017
  - –Final Technical Memorandum to stakeholders in November 2017
- Existing treatment operations, responsibility, and effectiveness
  - –Joint determination of ability to meet applicable federal/state standards
    - No detections in drinking water
    - Neither SGU or PA (IRP Site 18) water provided for potable purposes
    - No legally enforceable human-health or ecological-based standards currently, but likely to be developed in the future
  - –Air stripping/vapor-phase granular activated carbon not effective for PFAS
  - –Previously evaluated switching to liquid-phase granular activated carbon for treatment of groundwater

Settlement Agreement Stipulations (cont.)

- Groundwater ownership
- Proposed as-needed diversion of treated effluent to Michelson Water Recycling Plant
  - –Potential need for additional treatment?
  - –Water District policies/regulatory compliance?
- Potential end-user exposures
  - –Terrestrial
  - –Marine
  - –Purple water
  - –Previously unimpacted areas (golf courses, new portions of Principal Aquifer, etc.)